Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A modem for receiving a multitone signal having a plurality of symbols with a cyclic extension of length M samples transmitted through a channel, ~~the modem~~ comprising:

a signal input for receiving the multitone signal; and

a transversal equalizer ~~connected~~ coupled to the signal input~~, the transversal equalizer~~ and including a ~~Finite Impulse Response~~ finite impulse response filter having coefficients such that [[the]] a combined impulse response of the channel and the transversal equalizer targets a target impulse response having N taps, where N and M are integers and N<(M+1).

2. (Currently Amended) [[A]] The modem according to claim 1, wherein the modem [[has]] further comprises a bit adjustment means for lengthening or shortening ~~one or more symbols~~ a symbol for use in frequency domain interpolation.

3. (Currently Amended) [[A]] The modem according to claim 1, wherein N=M.

4. (Currently Amended) [[A]] The modem according to claim 1, wherein the target impulse response ~~having N samples~~ is ~~internally~~ represented by a data set having M+1 data elements, wherein at least [[the]] a first or a last of the M+1 data elements [[being]] is set to zero.

5. (Currently Amended) [[A]] The modem according to claim 1, including a ~~calculation~~ means for calculating the coefficients of the ~~Finite Impulse Response~~ finite impulse response filter to minimize an error function of [[the]] a difference between [[the]] a convolution of the channel with the transversal equalizer and a target impulse response having N taps.

6. (Currently Amended) [[A]] The modem according to claim 1, wherein [[the]] a difference between the combined impulse response of the channel and the transversal equalizer and the target impulse response is minimized.

7. (Currently Amended) A method [[of]] for equalizing a multitone signal formed of a stream of multitone symbols having an extension of length M samples passing through a channel with a finite impulse response filter having filter coefficients, ~~the method~~ including:

receiving the multitone signal ~~having an extension of length M samples~~ from the channel;

passing the multitone signal through [[a]] the finite impulse response filter ~~having filter coefficients~~;

delaying the multitone signal; and

adjusting the filter coefficients so that [[the]] a combined effect of the channel and the finite impulse response filter on the multitone signal targets a target impulse response having N samples of the delayed multitone signal, wherein N and M are integers and $N<(M+1)$.

8. (Currently Amended) [[A]] The method according to claim 7, further including adding or deleting bits ~~as required~~ to keep a phase rotation [[of]] within predetermined limits.

9. (Currently Amended) [[A]] The method according to claim 7, wherein N=M.

10. (Currently Amended) [[A]] The method according to claim 7, wherein the target impulse response ~~having N samples~~ is ~~internally~~ represented by a data set having M+1 data elements, and further including [[the]] a step of setting at least [[the]] a first or a last of the M+1 data elements to zero.

11. (Currently Amended) [[A]] The method according to claim 7, further including calculating the coefficients of the ~~Finite Impulse Response~~ finite impulse response filter to minimize an error function of [[the]] a difference between [[the]] a convolution of the channel with [[the]] a transversal equalizer and a target impulse response having N taps.

12. (Currently Amended) [[A]] The method according to claim 7, further including minimizing [[the]] a difference between

the combined impulse response of the channel and [[the]] a transversal equalizer; and

the target impulse response.

13. (Currently Amended) A computer program recorded on a data carrier for cooperating with a computer system having a processor and a memory including code to cause the ~~computer program~~ processor to carry out the steps of:

receiving [[the]] a multitone signal having an extension of length M samples from a [[the]] channel;

passing the multitone signal through a finite impulse response filter having filter coefficients;

delaying the multitone signal; and

adjusting the filter coefficients so that the combined effect of the channel and the finite impulse response filter on the multitone signal targets a target impulse response having N samples of the delayed multitone signal, wherein N and M are integers and $N<(M+1)$.

14. (Currently Amended) [[A]] The computer program according to claim 13, further including code for frequency modulating the multitone signal.

15. (Currently Amended) [[A]] The computer program according to claim 13, wherein N=M.

16. (Currently Amended) [[A]] The computer program according to claim 13, wherein the target impulse response having N samples is ~~internally~~ represented by a data set having M+1 data elements, and further including [[the]] a step of setting at least [[the]] a first or a last of the M+1 data elements to zero.

17. (Currently Amended) A system, comprising:

a first modem including [[:]]

a cyclic extension addition module for adding M extension samples to a discrete multitone (DMT) ~~symbols~~ symbol; and

a [[D/A]] digital-to-analog converter for transmitting the DMT ~~symbols~~ symbol and the M extension samples into a channel; and

a second modem including [[:]]

a signal input connected to the channel; and

a transversal equalizer [[connected]] coupled to the signal input, the transversal equalizer including a ~~Finite Impulse Response~~ finite impulse response filter having coefficients such that [[the]] a combined impulse response of the channel and the transversal equalizer targets a target impulse response having N taps, where N and M are integers and N<(M+1).

18. (Currently Amended) [[A]] The system according to claim 17, wherein the first modem includes a frequency phase rotation means and a means for at least one of bit addition and deletion ~~means for adjusting the~~ to adjust a phase of ~~transmitted bits~~ the DMT symbol and the M extension samples.

19. (Currently Amended) [[A]] The system according to claim 17, wherein

~~each of~~ the ~~first and~~ second modem further includes ~~modems include both transmission side circuitry including the~~ a second cyclic extension addition module and ~~the D/A~~ a second digital-to-analog converter; and

the first modem further includes ~~receiving side circuitry including the~~ a second signal input and [[the]] a second transversal equalizer.

20. (Currently Amended) A method of modem communication, including:

transmitting a [[first]] multitone signal having a phase ~~signals~~ from a first modem to a second modem through a channel, the multitone signal ~~signals being~~ formed of ~~a stream~~ plurality of ~~multitone~~ symbols and having an extension of length M samples;

~~transmitting second multitone signals from the second modem to the first modem through the channel, the multitone signals being formed of a stream of multitone symbols having an extension of length M samples;~~

~~in at least one of the two modems,~~ rotating the phase of ~~at least one of~~ the ~~signals and adding or deleting bits to the said at least one~~ multitone signal to align the plurality of symbols ~~of the first and second signals~~;

receiving the multitone signal ~~signals~~ from the channel;

passing the multitone signal ~~signals~~ through a finite impulse response filter having filter coefficients;

delaying the multitone signal; and

adjusting the filter coefficients so that the combined effect of the channel and the finite impulse response filter on the multitone signal targets a target impulse response having N samples of the delayed multitone signal, wherein N and M are integers and $N<(M+1)$.

21. (New) The method of claim 20, further including adding a bit to at least one of the first multitone signal and the second multitone signal to align the plurality of symbols of the first multitone signal and the second multitone signal.

22. (New) The method of claim 20, further including deleting a bit from at least one of the first multitone signal and the second multitone signal to align the plurality of symbols of the first multitone signal and the second multitone signal.